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Applicant: Mark J. Jaroszeski et al.
Serial No. 09/939,518
Filing Date: 08/24/2001
Practitioner's Docket No.: 1372.34

Group Art: 1635
Examiner: Jon E. Angell

AMENDMENT TO THE CLAIMS:

1. (Currently Amended) A method for facilitating the delivery of a desired molecule into a target tissue comprising the steps of:

5 introducing a molecule into a target tissue comprising a cell; and

applying an electric field to the target tissue, the application of the electric field consisting of a single continuous low-level electric field applied for a duration of 100ms to 20 minutes; and ~~to effect~~

10 effecting a change in porosity of the cell of the target tissue in response to the application of the electric field, the change in porosity sufficient to facilitate entry of a desired molecule into an interior of the cell.

2. (Previously Presented) The method recited in Claim 1, wherein the duration of the applying step is in a range of 100ms to 100 sec.

3. (Cancelled)

15 4. (Original) The method recited in Claim 1, wherein the low-level electric field has a field strength comprising 200V/cm or less.

5. (Cancelled)

20 6. (Original) The method recited in Claim 1, wherein the electric field comprises a pulse selected from a group of waveforms consisting of square, rectangular, exponentially decaying, exponentially increasing, bipolar, and sinusoidal; waveforms having a nongeometrically characterizable shape; waveforms characterizable by a mathematical function; waveforms characterizable by a mathematical approximation; waveforms with at least one

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of an AC or a DC offset signal; and waveforms without an AC or a DC offset signal.

7. (Cancelled)

8. (Original) The method recited in Claim 1, wherein the introducing step comprises the step selected from a group consisting of syringe injection, jet injection, oral dosing, transdermal delivery, infusion into tissue, and infusion into a blood vessel.

9. (Cancelled)

10. (Original) The method recited in Claim 1, wherein the target tissue is selected from a group consisting of skin, tumor, muscle, blood, blood vessel, brain, lymph, liver, pancreas, bone, colon, cardiac, lung, breast, testes, cornea, prostate, and intestine.

11. (Currently Amended) A system for facilitating the delivery of a desired molecule into a target tissue comprising:

a molecule introducer adapted to introduce a molecule into a target tissue comprising a cell; and

an applicator for applying an electric field to the target tissue, wherein the application of the electric field consists of applying a single continuous low level electric field for a duration of 100ms to 20 minutes to effect a change in porosity of the cell of the target tissue in response to the application of the electric field, the change in porosity sufficient to facilitate an entry of a desired molecule into the interior of the cell.

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12. (Previously Presented) The system recited in Claim 11, wherein the applicator applies the electric field for a duration of 100ms to 100 sec.

13. (Cancelled)

14. (Original) The system recited in Claim 11, wherein the low-level electric field has a field strength comprising 200V/cm or less.

15. (Cancelled)

16. (Original) The system recited in Claim 11, wherein the electric field comprises a pulse selected from a group consisting of square, rectangular, exponentially decaying, exponentially increasing, bipolar, and sinusoidal; waveforms having a nongeometrically characterizable shape; waveforms characterizable by a mathematical function; waveforms characterizable by a mathematical approximation; waveforms with at least one of an AC or a DC offset signal; and waveforms without an AC or a DC offset signal.

17. (Cancelled)

18. (Previously Presented) The system recited in Claim 11, wherein the molecule introducer is selected from a group consisting of a syringe, a jet injector, an oral dosage, a transdermal deliverer, a tissue infuser, and a blood vessel infuser.

19. (Cancelled)

20. (Previously Presented) The system recited in Claim 11, wherein the target tissue is selected from a group consisting a skin, tumor, muscle, blood, blood vessel, brain, lymph, liver, pancreas, bone, colon, cardiac, lung, breast, testes, cornea, prostate and intestine.

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21. (Previously Presented) A method for facilitating the delivery of a desired molecule into a target tissue comprising the steps of:

introducing a molecule into a target tissue comprising a cell; and

5 applying a continuous low-level electric field to the target tissue for a duration of 200ms to 20 minutes to effect a change in porosity of the cell of the target tissue sufficient to facilitate entry of a desired molecule into an interior of the cell.

22. (Previously Presented) The method recited in Claim 21, wherein the duration of the applying step is in a range of 200ms to 100 sec.

10 23. (Previously Presented) The method recited in Claim 21, wherein the low-level electric field has a field strength comprising 200V/cm or less.

15 24. (Previously Presented) The method recited in Claim 21, wherein the applying step comprises applying a plurality of substantially continuous low-level electric pulses to the target tissue, wherein the duration of each substantially continuous low-level electric field is sufficient to effect a change in porosity of the cell of the target tissue sufficient to facilitate entry of a desired molecule into an interior of the cell.

20 25. (Previously Presented) The method recited in Claim 21, wherein the electric field comprises a pulse selected from a group of waveforms consisting of square, rectangular, exponentially decaying, exponentially increasing, bipolar, and sinusoidal; waveforms having a nongeometrically characterizable shape; waveforms characterizable by a mathematical function; waveforms characterizable by a mathematical approximation; waveforms with at least one of an AC or a DC offset signal; and waveforms without an AC or a DC offset
25 signal.

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26. (Previously Presented) The method recited in Claim 25, wherein the electric field comprises a pulse comprising a combination of at least two of the pulses selected from the group of waveforms.

5 27. (Previously Presented) The method recited in Claim 21, wherein the introducing step comprises the step selected from a group consisting of syringe injection, jet injection, oral dosing, transdermal delivery, infusion into tissue, and infusion into a blood vessel.

10 28. (Previously Presented) The method recited in Claim 21, wherein the target tissue is selected from a group consisting of skin, tumor, muscle, blood, blood vessel, brain, lymph, liver, pancreas, bone, colon, cardiac, lung, breast, testes, cornea, prostate, and intestine.

29. (Previously Presented) A system for facilitating the delivery of a desired molecule into a target tissue comprising:

15 a molecule introducer adapted to introduce a molecule into a target tissue comprising a cell; and

an applicator for applying a continuous low-level electric field to the target tissue for a duration of 200ms to 20 minutes to effect a change in porosity of the cell of the target tissue sufficient to facilitate an entry of a desired molecule into the interior of the cell.

20 30. (Currently Amended) The system recited in Claim 29, wherein the applicator applies the electric field for a duration of ~~400ms~~ 200ms to 100 sec.

31. (Previously Presented) The system recited in Claim 29, wherein the low-level electric field has a field strength comprising 200V/cm or less.

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32. (Previously Presented) The system recited in Claim 29, wherein the applicator applies the low-level electric field in a series of electric pulses.

33. (Previously Presented) The system recited in Claim 29, wherein the electric field comprises a pulse selected from a group consisting of square, rectangular, exponentially decaying, exponentially increasing, bipolar, and sinusoidal; waveforms having a nongeometrically characterizable shape; waveforms characterizable by a mathematical function; waveforms characterizable by a mathematical approximation; waveforms with at least one of an AC or a DC offset signal; and waveforms without an AC or a DC offset signal.

34. (Previously Presented) The system recited in Claim 33, wherein the electric field comprises a pulse comprising a combination of at least two of the pulses selected from the group of waveforms.

35. (Previously Presented) The system recited in Claim 29, wherein the molecule introducer is selected from a group consisting of a syringe, a jet injector, an oral dosage, a transdermal deliverer, a tissue infuser, and a blood vessel infuser.

36. (Previously Presented) The system recited in Claim 29, wherein the target tissue is selected from a group consisting a skin, tumor, muscle, blood, blood vessel, brain, lymph, liver, pancreas, bone, colon, cardiac, lung, breast, testes, cornea, prostate and intestine.

37. (New) A method for facilitating the delivery of a desired molecule into a target tissue comprising the steps of:

introducing a molecule into a target tissue comprising a cell; and

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applying a continuous low-level electric field to the target tissue for a duration of 110ms to 20 minutes to effect a change in porosity of the cell of the target tissue sufficient to facilitate entry of a desired molecule into an interior of the cell.

5 38. (New) The method recited in Claim 37, wherein the duration of the applying step is in a range of 110ms to 100 sec.

39. (New) The method recited in Claim 37, wherein the low-level electric field has a field strength comprising 200V/cm or less.

10 40. (New) The method recited in Claim 37, wherein the applying step comprises applying a plurality of substantially continuous low-level electric pulses to the target tissue, wherein the duration of each substantially continuous low-level electric field is sufficient to effect a change in porosity of the cell of the target tissue sufficient to facilitate entry of a desired molecule into an interior of the cell.

15 41. (New) The method recited in Claim 37, wherein the electric field comprises a pulse selected from a group of waveforms consisting of square, rectangular, exponentially decaying, exponentially increasing, bipolar, and sinusoidal; waveforms having a nongeometrically characterizable shape; waveforms characterizable by a mathematical function; waveforms
20 characterizable by a mathematical approximation; waveforms with at least one of an AC or a DC offset signal; and waveforms without an AC or a DC offset signal.

25 42. (New) The method recited in Claim 37, wherein the electric field comprises a pulse comprising a combination of at least two of the pulses selected from the group of waveforms.

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43. (New) The method recited in Claim 37, wherein the introducing step comprises the step selected from a group consisting of syringe injection, jet injection, oral dosing, transdermal delivery, infusion into tissue, and infusion into a blood vessel.

5 44. (New) The method recited in Claim 37, wherein the target tissue is selected from a group consisting of skin, tumor, muscle, blood, blood vessel, brain, lymph, liver, pancreas, bone, colon, cardiac, lung, breast, testes, cornea, prostate, and intestine.

10 45. (New) A system for facilitating the delivery of a desired molecule into a target tissue comprising:

a molecule introducer adapted to introduce a molecule into a target tissue comprising a cell; and

15 an applicator for applying a continuous low-level electric field to the target tissue for a duration of 110ms to 20 minutes to effect a change in porosity of the cell of the target tissue sufficient to facilitate an entry of a desired molecule into the interior of the cell.

46. (New) The system recited in Claim 45, wherein the applicator applies the electric field for a duration of 110ms to 100 sec.

20 47. (New) The system recited in Claim 45, wherein the low-level electric field has a field strength comprising 200V/cm or less.

48. (New) The system recited in Claim 45, wherein the applicator applies the low-level electric field in a series of electric pulses.

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49. (New) The system recited in Claim 45, wherein the electric field comprises a pulse selected from a group consisting of square, rectangular, exponentially decaying, exponentially increasing, bipolar, and sinusoidal; waveforms having a nongeometrically characterizable shape; waveforms characterizable by a mathematical function; waveforms characterizable by a mathematical approximation; waveforms with at least one of an AC or a DC offset signal; and waveforms without an AC or a DC offset signal.

50. (New) The system recited in Claim 45, wherein the electric field comprises a pulse comprising a combination of at least two of the pulses selected from the group of waveforms.

51. (New) The system recited in Claim 45, wherein the molecule introducer is selected from a group consisting of a syringe, a jet injector, an oral dosage, a transdermal deliverer, a tissue infuser, and a blood vessel infuser.

52. (New) The system recited in Claim 45, wherein the target tissue is selected from a group consisting a skin, tumor, muscle, blood, blood vessel, brain, lymph, liver, pancreas, bone, colon, cardiac, lung, breast, testes, cornea, prostate and intestine.